

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Rocky Mountain Wolf Recovery Annual Reports

Wildlife Damage Management, Internet Center
for

January 2000

Rocky Mountain Wolf Recovery 2000 Annual Report

Follow this and additional works at: <https://digitalcommons.unl.edu/wolfrecovery>



Part of the [Environmental Health and Protection Commons](#)

"Rocky Mountain Wolf Recovery 2000 Annual Report" (2000). *Rocky Mountain Wolf Recovery Annual Reports. 2.*

<https://digitalcommons.unl.edu/wolfrecovery/2>

This Article is brought to you for free and open access by the Wildlife Damage Management, Internet Center for at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Rocky Mountain Wolf Recovery Annual Reports by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Rocky Mountain Wolf Recovery 2000 Annual Report

*A cooperative effort by the U.S. Fish and Wildlife Service,
the Nez Perce Tribe, the National Park Service, and USDA Wildlife Services*



M. Murre 2000

This cooperative annual report presents information on the status, distribution and management of the recovering Rocky Mountain wolf population from January 1, 2000 through December 31, 2000. It is also available at <http://mountain-prairie.fws.gov/wolf/annualrpt00/>

BACKGROUND

Gray wolf populations (*Canis lupus*) were extirpated from the western U.S. by the 1930s. Subsequently, wolves from Canada occasionally dispersed south into Montana and Idaho but failed to survive long enough to reproduce. Public attitudes toward predators changed and wolves received legal protection with the passage of the Endangered Species Act (ESA) in 1973. Wolves began to successfully recolonize northwest Montana in the early 1980s. By 1995, 6 packs lived entirely in northwestern Montana. In 1995 and 1996, 66 wolves from southwestern Canada were reintroduced to Yellowstone National Park (YNP) (31 wolves) and central Idaho (35 wolves).

The Rocky Mountain wolf population comprises 3 recovery areas: The Northwest Montana recovery area (NWMT, Figs. 1, 2) includes northwest Montana and the northern Idaho panhandle. The Greater Yellowstone recovery area (GYA, figs. 1, 4) includes Wyoming and adjacent parts of southeast Idaho and southeast Montana. The Central Idaho recovery area (ID, Figs. 1, 3) includes central Idaho and adjacent parts of southwest Montana. Wolves in the 3 recovery areas are managed under different guidelines, depending upon their designated status under the Endangered Species Act (ESA). NWMT wolves are classified as endangered, the most protected classification under the ESA. GYA and ID wolves are classified as nonessential experimental populations and managed with more flexible options than the endangered population. The Service believes that 30 breeding pairs of wolves, with an equitable and uniform distribution throughout the 3 states for 3 successive years would constitute a viable and recovered wolf population. If other provisions required to delist are met, primarily adequate regulatory mechanisms in the form of state wolf management plans that would reasonably assure that the gray wolf would not become threatened or endangered again, the Service would propose delisting. It is expected that meeting the recovery goal and delisting will occur within 3 to 5 years.

NORTHWESTERN MONTANA WOLF RECOVERY AREA

Personnel

The year 2000 saw changes in the staffing of the USFWS wolf recovery program, as Diane Boyd took a job in the private sector, and Tom Meier moved to Kalispell, where Montana Fish, Wildlife & Parks is providing the USFWS with office space. The Turner Endangered Species Fund hired Val Asher to work closely with USFWS on monitoring and research with Montana wolves. In 2001 the USFWS expects to hire two seasonal biologists to help with summer field work. As in previous years, volunteers will also help with wolf collaring and monitoring efforts. Staffing of USDA/APHIS/Wildlife Services changed as Carter Niemeyer, formerly the Rocky Mountain wolf specialist working out of Helena, left to take a job with the USFWS in Boise ID. As local Wildlife Services agents have become more familiar with wolves, they have taken over the handling of wolf livestock depredations, and the agency will now rely on them for most investigations and control actions.

Monitoring

Spring and Fall trapping efforts resulted in the capture and collaring of 7 wolves from 5 packs. Field work was hampered by widespread forest fires and the closing of public lands that resulted from them. At the end of 2000, 19 radio-collared wolves (~30% of the population) from 8 different packs were transmitting in the NWMT area. These packs, together with uncollared packs and suspected new packs, totaled about 64 wolves in the area (Figs. 1, 2; Tables 1, 4). Radio-collared wolves were located from airplanes approximately twice per month. Collared wolves in and around Glacier National Park (GNP) were located daily from the ground in summer and at least weekly in winter by GNP and USFWS staff and volunteers. Packs included in the NWMT recovery area as of December 2000 were South Camas, North Camas, Murphy Lake, Ninemile, Boulder, Whitefish, Grave Creek, Little Wolf, and Spotted Bear (Table 1). Packs that occasionally travel into NWMT but den and spend most of their time in Canada, and therefore are not counted in the NWMT area, include the Wigwam, Spruce Creek, and Belly River Packs. No radio-collared animals lived as resident lone wolves in 2000, although several dispersing or translocated wolves traveled alone for varying periods of time. Eight collared wolves were known to have dispersed from their packs in 2000, and another eight disappeared and may have dispersed (Table 1).

Several small, new packs of wolves are known or suspected, including a pack that reportedly had pups in the Danaher River area of the Bob Marshall Wilderness, possible packs in the Lincoln/Alice Creek and Ovando areas south of the Scapegoat Wilderness, a pack of 3 south of Libby in the Fishtrap/McGinnis Creek area, a pair of wolves found killing cattle north of Browning, and a pair of wolves seen in the North Fork of the Sun River drainage.

Reproduction was confirmed in the North Camas, Murphy Lake, Ninemile, Boulder, Whitefish, Grave Creek and Spotted Bear Packs, and suspected but not confirmed in the Little Wolf and Danaher Packs (Table 1). Pup survival appeared to be low, with only 3 of 7 Murphy Lake pups, 4 of 5 Whitefish pups, and 0 of 2 Spotted Bear pups surviving into 2001. The presence of only 2 pups in the North Camas and Grave Creek Packs in winter 2000-2001 also suggested that some pups may have been lost earlier. Cause of death for these pups is unknown. A minimum of 18 wolves (radio-collared and uncollared) died in northwestern Montana in 2000. This count does not include animals that disappeared whose fates were unknown. Where the cause of death was known, illegal killing by humans was the most common (at least 7 wolves), followed by government control actions (4 wolves) and train or car strikes (4 wolves).

Outreach

Program personnel presented informational talks and status reports throughout the year to various federal and state agencies, public and private institutions, special interest groups, and rural communities. During 2000, project personnel (USFWS and WS) gave 50 public presentations to approximately 3300 people. Additionally, scores of informal presentations to small groups or individuals were conducted during this time. Numerous radio and television interviews and news spots featuring project personnel were broadcast locally and nationally.

Livestock Depredations and Management

All reports of wolf depredation on livestock are investigated by USDA/APHIS/Wildlife Services, who then take appropriate control action in consultation with USFWS. Livestock losses and resulting control efforts were lower in 2000 than in 1999. Confirmed losses in 2000 included 10 cattle, 2 sheep, and 3 dogs (Tables 1 and 5). In wooded and/or mountainous country, livestock carcasses may not be found promptly, if ever. It can be difficult or impossible to confirm wolf depredation when livestock carcasses are eaten or decomposed. Therefore, confirmed losses represent only a portion of actual losses. Whether this is a large or small portion of such losses is the subject of much controversy and current research (see Diamond Moose calf mortality study, Central Idaho section). With wolves occupying more widespread areas and awareness of wolves increasing, more ranchers suspect wolf depredation. In addition to the 11 incidents of verified wolf depredation in northwest Montana, USDA/APHIS/Wildlife Services investigated approximately 25 other reports that were not verifiable as wolf depredation or were attributed to other causes. Depredation control efforts resulted in the killing of 4 wolves. All confirmed livestock depredations by wolves in NWMT in 2000 occurred on private land.

Little Wolf Pack: Since 1990, two wolf packs, the Marion and Pleasant Valley Packs, have been virtually eliminated by control actions in the Pleasant Valley/Lost Prairie area west of Kalispell. Prior to 2000, 8 wolves had been killed and another 8 translocated from this area. After the removal of the Pleasant Valley Pack in 1999, the Little Wolf Pack moved down from the north and began killing cattle in the area. Four wolves from the Little Wolf Pack were killed in two control actions in 2000. The formation of Lost Trail National Wildlife Refuge and several adjoining conservation easements will greatly reduce the number of cattle being grazed in this area and increase the opportunity for wolves to successfully reoccupy it.

Boulder Pack: No other wolf control was conducted in NWMT in 2000, except for capture, collaring and release on site. The Boulder Pack near Deer Lodge was involved in the confirmed losses of 3 calves, and the ranch where this pack lives reported losses of 40 calves in 2000, compared to normal losses of 15-20 calves. The cattle were not monitored closely in summer because of widespread forest fires and land closures. In 2001, several juvenile members of the Boulder Pack will be captured and relocated to more remote parts of NWMT, to decrease the food demands of the Boulder Pack in hopes of reducing the likelihood of depredations.

Other Packs: The Grave Creek Pack near Eureka killed one calf in Spring 2000. This is the first known depredation by this pack, which usually lives in remote parts of the Whitefish Range. A yearling female wolf was captured and radio-collared 1/4 mile from the scene of the depredation, the same morning. The wolves soon moved away from the area and no further problems were reported. A single wolf killed a calf near Lincoln in May 2000. The Alice Creek Pack, east of Lincoln and south of the Scapegoat Wilderness, killed 2 lambs in August. Efforts to locate and collar this pack in 1999 and 2000 were unsuccessful. In December 2000, a pair of wolves killed 3 heifers near Browning on the Blackfeet Reservation. The wolves could not be located so no control was attempted. Sporadic depredations and reports of wolves have come from this area east of Glacier National Park over the last 20 years.

Dog attacks: Losses of domestic dogs to wolves in 2000 included one guarding dog that was attacked and eventually disappeared in the Ninemile Valley, and two lion-hunting dogs killed in the Fish Creek drainage, probably by the Kelly Creek Pack, which spends most of its time in the Central Idaho recovery area.

Rancher compensation: Since 1987, Defenders of Wildlife has administered a compensation program to reimburse ranchers for livestock losses to wolves in the Rocky Mountain States. Since 1987, more than \$150,000 has been paid to ranchers in Montana, Idaho and Wyoming. For information on that program, see the Defenders website:
<http://www.defenders.org/wolfcomp.html>

GREATER YELLOWSTONE WOLF RECOVERY AREA

Personnel

USDA/APHIS/Wildlife Services Wyoming State Director Rick Phillips retired in 2000 and was replaced by Rod Krischke. Yellowstone National Park wolf biologist Kerry Murphy left the wolf program to lead the Park's efforts to understand rare forest carnivores such as lynx and marten. Shaney Evans, formerly a research assistant with the Yellowstone Park Foundation, is now conducting graduate research on elk and wolves in YNP.

Monitoring

At the end of 2000, at least 177 wolves in 18 packs (including 13 breeding pairs as defined in the recovery plan) were present in the Greater Yellowstone Area (GYA) (Figures 1, 3, Tables 2, 4). Fourteen wolves were captured and radio-collared by helicopter in January and February 2000, and 2 wolves were captured with traps, radio-collared and released on site south of the park in summer 2000. At the end of the year, 43 radio-collared wolves (26% of the population) were being monitored. Approximately 119 wolves (8 packs) were located inside Yellowstone National Park (YNP) and 58-60 outside YNP (10 packs: 6 in Wyoming and 4 in Montana). One new pack formed inside YNP, a dispersing female (#152) from the Leopold Pack paired with an uncollared wolf and had a litter of at least four pups in the Swan Lake-Sepulcher area of YNP. They were named the Swan Lake Pack. Two new packs formed northeast of YNP, the Absaroka and Beartooth Packs. Pack size in the GYA averaged 9.3 wolves with larger packs in YNP (mean = 14.6) than outside the park (mean = 5.8). Collared wolves were located approximately 4 times per month by airplane and more often by ground crews in several research areas both inside and outside YNP.

A total of 71-77 pups survived to December 31, 2000. Pup survival was higher in 2000 in YNP than in 1999 (2000 = 65 of 84, 77%; 1999 = 18 of 40, 45%). Parvovirus possibly explained the poor survival in 1999 as all captured wolves tested positive, and the timing of pup mortality was during the post-weaning period, when pups become vulnerable. Sixteen litters were born to 13 breeding pairs. Two packs had more than one litter, the Druid Peak Pack had at least three and

the Rose Creek Pack had two. Recovery plan standards define a breeding pair as a male and female wolf that successfully raise at least two pups to December 31. Because these packs with multiple litters contained only a single breeding male, each pack was counted as a single breeding pair for recovery purposes.

At least 20 wolves died in GYA in 2000. These mortalities do not include pups that died within the first 4 months of life. Nine wolves died due to human caused mortality (6 in control actions, 2 from vehicle strikes, 1 illegal killing), 4 to natural causes (prey, cougar or other wolves), and 5 to unknown mortality, some of which are still under investigation. Six collared wolves were known to have dispersed away from their home packs. Another 3 collared wolves are missing and may have dispersed (Table 2).

Two YNP packs were renamed because they no longer lived in the area they were named after, and none of the original wolves were still present in the pack (although descendants are still present). The Crystal Creek Pack, which resides in Pelican Valley, was renamed Mollie's Pack after the late Director of the Fish and Wildlife Service, Mollie Beattie, to recognize her extraordinary contribution to wolf recovery in the northern Rockies. The Soda Butte Pack was renamed the Yellowstone Delta Pack after the Yellowstone River delta, an area of YNP where they are often located.

Ongoing Research

Research in Yellowstone National Park

Wolf-Prey Relationships: Wolf-prey relationships were documented by observing wolf predation directly and by recording characteristics of wolf prey at kill sites. Wolf packs were monitored during two winter-study sessions, periods of time in which wolves were intensively radio-tracked each day for 30 consecutive days during March and November-December. The Leopold, Rose Creek, and Druid Peak Packs were monitored by teams of two persons from the ground and from aircraft; the Chief Joseph, Crystal Creek (Mollie's), Nez Perce, Sheep Mountain, and Soda Butte (Yellowstone Delta) Packs were monitored from aircraft only. Behavioral interactions between wolves and prey, predation rates, the total time wolves fed on their kills, percent consumption of kills by wolves and scavengers, characteristics of wolf prey (e.g., nutritional condition), and characteristics of kill sites were recorded and entered into a data base. The abundance and sex-age composition of elk within wolf pack territories were also estimated from the ground and from fixed-wing aircraft.

Composition of Wolf Kills: Project staff detected 113 definite and 210 probable kills made by wolves in 2000, including 281 elk (87% of total), 10 bison (3%), 4 moose (1%), 5 deer (1.5%), 4 coyotes (1%), 1 wolf, and 17 unknown prey (5%). The composition of elk kills was 34% calves (0-12 months), 34% cows, 19% bulls, and 13% unknown sex and age. Bison kills included 3 calves, 1 cow, 1 bull, and 4 adults of unknown sex. Moose kills included 2 cows, and 2 of unknown age and sex. Most bison and moose were killed during late winter.

Winter studies: During the March winter study, wolves were observed for 261 hours from the ground. The number of days wolf packs were located from the air ranged from 10 (Soda Butte Pack) to 23 (Leopold, Rose Creek, Druid Peak, and Nez Perce Packs). Eighty-five definite or probable wolf kills were detected, including 70 elk, 5 bison, 1 mule deer, 3 moose, 1 coyote, and 5 prey of unknown species. Among elk, 30 (43%) kills were calves, 23 (33%) were cows, 14 (20%) were bulls, 2 (3%) were adults of unknown sex, and 1 (1%) kill was an elk of unknown sex and age. Packs that resided on the northern range averaged 1 ungulate kill per 1-3 days. During the November-December winter study, wolves were observed for 309 hours from the ground. The number of days wolf packs were located from the air ranged from 11 (Soda Butte Pack) to 21 (Swan Lake, Leopold, and Rose Creek Packs). Sixty-seven definite or probable wolf kills were detected, including 63 elk, 1 bison, 1 coyote, and 2 unknown prey. Among elk, 15 (24%) kills were calves, 19 (30%) were cows, 24 (38%) were bulls and 5 (8%) kills were elk of unknown sex and age. Packs that resided on the northern range averaged 1 ungulate kill per 2-3 days.

Other Carnivore Studies: In addition to studies on wolf-prey relationships, YNP staff and researchers from the Biological Resources Division (BRD), the Hornocker Wildlife Institute (HWI), U.S. Forest Service (USFS), and State of Montana began collaborative studies of carnivore interactions on the northern range of YNP and Gallatin National Forest. A 3-month study using funds from all of the above agencies, plus funds raised privately by the Yellowstone Park Foundation (YPF) examined the effects of big game hunting on carnivore behavior before and after the hunting season north of YNP. YNP was considered a refuge from human activity during the hunting season. Preliminary results indicate that grizzly bears were drawn toward hunter activity, cougars were repulsed, and wolves were affected little.

Wolf Genetics: Familial relationships among Yellowstone wolves were estimated using microsatellite analysis of DNA that was collected from live-captured or dead wolves. One-hundred-fourteen free-ranging wolves born in 14 different packs (26 total litters) were genotyped at 12-23 loci, including 79 offspring. A wolf pedigree was constructed. Preliminary results suggested that, immediately after reintroduction, Yellowstone wolves were more polygynous than in areas characterized by wolves in long-standing populations. Three publications are in preparation. This work is a collaborative effort with Eric Mathur and Dorris Hafenbradl at Diversa Corporation, Janet Zeigle and Larry Joe at Celera Agen Corporation, Dr. Karl Broman at Johns Hopkins University, Dr. Michael McClelland at Sidney Kimmel Cancer Center, and John Varley and Sara Stevenson at the Yellowstone Center for Resources.

Wolf Management: Radio-collaring: Fourteen wolves were captured by helicopter darting in January and February 2000. Eight males and 6 females were captured. Nine and 5 were adults and pups, respectively. This was an unusual age composition for helicopter capture of wolves as typically >80% of the wolves captured in YNP are pups. Below normal pup survival was likely a contributing factor to this capture ratio. Wolves were captured in the following packs: Rose Creek (4), Leopold (2), Crystal Creek (2), Nez Perce (2), Sheep Mountain (2), Chief Joseph (1), and Druid Peak (1). Besides attachment of radio collars, standard measurements and blood (genetics and disease monitoring) were collected on all wolves handled.

Pen Removal: The wolf acclimation pen near Nez Perce Creek and the remaining portions of the Trail Creek, Fishing Bridge, and Blacktail Deer Plateau pens were removed from the field during August and stored near Stephens Creek. Only one pen left over from the 1995 reintroduction in Lamar Valley is still standing in YNP.

Research in Wyoming outside Yellowstone National Park

Winter prey selection of wolves in the Gros Ventre River drainage:

Cooperators: USFWS, Grand Teton National Park, US Forest Service, and the National Elk Refuge.

We monitored wolves near Jackson Hole, Wyoming to: 1) determine wolf distribution and occurrence, 2) determine winter food habits of wolves, and 3) describe the behavioral response of elk to the presence of wolves. In 2000, 2 wolf packs resided in the Jackson Hole area. We located radio-collared wolves several times per week and estimated home ranges using 95% minimum convex polygons. The Teton Pack (5 wolves) established a home range of approximately 1,414 km² (546 miles²) using the Gros Ventre River drainage and the northeastern corner of Grand Teton National Park. The Gros Ventre Pack (6 wolves) had a home range of approximately 1,100 km² (425 miles²) that overlapped with the Teton Pack in the Gros Ventre River drainage and extended southwest onto the National Elk Refuge.

During winter, we located and examined 40 wolf kills by snow-tracking the Teton and Gros Ventre Packs from January 19, 2000 to April 5, 2000. Eleven additional kills were located during aerial telemetry flights or discovered by biologists from other agencies. Wolves killed 48 elk, 2 coyotes, and 1 beaver. Fifty-six percent of the elk killed were calves and 44% were adult cows. Due to high consumption of calf carcasses, it was not possible to determine sex on most of the calves killed. Mean consumption of carcasses by wolves was 84%.

The Teton and Gros Ventre Packs routinely hunted elk on 3 state feed grounds located 5 miles apart along the Gros Ventre River drainage. Approximately 800 elk were fed hay in each feed ground. When wolves hunted near the northern (Alkali) feed ground, elk routinely left the area and dispersed to the middle (Cabin) feed ground. When wolves hunted elk near the southern (Fish Creek) feed ground, elk also dispersed to the Cabin feed ground. Throughout the winter, about 2000 elk frequented the Cabin feed ground. Even though wolves killed elk on Cabin feed ground, elk often remained in the area. We did not detect any surplus killing. Alkali feed ground had considerably more tree cover around its perimeter, while Fish Creek feed ground had deeper snow cover. The Cabin feed ground was surrounded by relatively open sagebrush. We hypothesized that elk congregated in larger herds as a predator defense strategy and preferred Cabin feed ground due to its relatively lower snow cover and better visibility to see approaching predators. However, fidelity to Cabin feed ground was probably also influenced by the 100+ bales of hay put out each day for elk to eat. The unexpected crowding of elk at Cabin feed ground became very controversial as the state game management agency was forced to adjust winter feeding programs.

Aversive Conditioning of Captive Wolves:

Cooperators: Turner Endangered Species Fund, USDA/APHIS/Wildlife Services, USFWS.

We tested aversive conditioning on wolves at the Flying D Ranch in Bozeman, MT in an attempt to look at alternative non-lethal methods to manage wolf depredations. We received 4 members of the Sheep Mountain Pack that were killing cattle in the Paradise Valley. They were placed in a 1 acre pen and allowed to acclimate for several months before aversive conditioning trials were initiated. When the wolves were captured to fit electronic training collars, wolf #16 died of renal failure due to heat stress. A calf with an Innotech remote training system was placed in the pen with the two 2-year-old wolves and one yearling male wolf. Wolves were shocked when they came within 1 meter of the calf. We initially tested the collars by placing a beef hide in the pen. Wolf # 195 received a shock when it approached the hide and immediately retreated and remained wary of the hide for the next 6 hours. The other 2 wolves watched the wary behavior of wolf #195 and would not approach the hide nor that side of the pen for the duration of the trial. We placed a bison calf in the pen to allow wolves to kill native prey. The wolves made 1 attempt snapping at the head of the bison calf, but the calf showed no vulnerability and continued to live in the pen for 10 days. When it was apparent the wolves would not kill the bison calf, we euthanized the calf and allowed the wolves to feed on it.

Five trials with a beef calf were conducted. We allowed the calf to roam freely in the pen. We left the calf in the pen overnight during 1 trial and found it unharmed the next morning. Interactions between wolves and calf ranged from bedding down to agitation and pacing by both species, to the calf chasing the wolves around the pen. We observed #195 grab the calf by a hind leg. The collar did not seem to shock and we immediately shouted, stopping the attack. Another trial was conducted after this attempt, but the wolves would not come near the calf.

We are still in research and development stages of this project. Improvements are being made to the collars by adding a digital logger to verify that wolves are receiving shocks. We believe pack dynamics of decision makers in the group may play a major role in whether attacks occur. The project will continue for 2-3 years to test this method.

The three Sheep Mountain wolves, wearing conventional radio collars, were released back into their natal territory in December. They visited their old den site and rendezvous site and split up during the late elk hunt. Wolf #195 has remained in his territory on the east side of Paradise Valley and was seen with up to 4 other uncollared wolves. Wolf #189 and #196 stayed together and traveled with a dispersing female (wolf #155 from the Rose Creek Pack), frequenting the west side of Paradise Valley. On March 1, wolf #189 was found dead. His death is under investigation. Wolf #196 and #155 split up after this incident and continued to travel alone. To date, no depredations have been documented by these wolves.

Outreach

YNP wolf staff gave approximately 70 formal presentations to approximately 2000 people and an untallied number of informal talks both within and outside YNP. The internationally televised wolf documentary about Yellowstone wolves Return of the Wolf by Robert Landis and National Geographic was televised in November 2000.

USFWS staff gave numerous presentations and status reports to federal and state agencies, conservation groups, rural communities, guide/outfitter organizations, livestock associations, schools, and various other public and private institutions. Wolf recovery personnel also participated in local radio call-in programs, television interviews, and newspaper feature stories.

Livestock depredations and management

Wyoming portion of GYA

Potential wolf depredations in Wyoming are investigated by Wildlife Services (WS) and the USFWS. Depredations are classified as either confirmed, probable, possible/unknown, or other, based on specific criteria agreed upon by the USFWS and WS. If wolf predation is confirmed, nonlethal or lethal control, or a combination thereof, is implemented under the direction and authorization of the USFWS. Confirmed losses in Wyoming for 2000 included: 3 cattle, 25 sheep, and 5 dogs. Probable depredations included: 2 horses and 21 sheep. One horse was killed and recorded as a possible wolf depredation. Four dogs and 1 calf were attacked by wolves but survived. No livestock losses were reported from the Absaroka, Beartooth, or Sunlight Basin packs east of Yellowstone National Park.

Gros Ventre Pack: The Gros Ventre Pack killed 2 calves and 3 dogs on federal grazing allotments. One dog and 1 calf survived the attacks. Two wolves were removed and 1 wolf was radio-collared and released on-site.

Teton Pack: The Teton Pack killed 1 calf and attacked 1 herding dog on federal grazing allotments. The dog was taken to a veterinarian and survived. No control was conducted and no further depredations occurred.

Washakie Pack: The Washakie Pack killed 2 dogs, 3 horses, and attacked a third dog which later died of injuries suffered in the attack. Two of the horse depredations were recorded as probable and 1 was recorded as possible. All depredations occurred on private land. One wolf was trapped, radio-collared, and released on-site.

Uncollared wolves: Wildlife Services investigated complaints of a pair of wolves and a single wolf killing sheep in the Kemmerer and Pinedale areas. Twenty-five confirmed kills and 21 probable kills were recorded on both public and private land. A lethal control action was initiated but no wolves were removed and no further depredations were reported.

South-central Montana portion of GYA

Chief Joseph Pack: Livestock depredations continue to occur as wolves move north out of YNP into the Paradise Valley area of south-central Montana. The Chief Joseph Pack killed several sheep and guard dogs in Tom Miner Basin, just north of the park, prior to 2000. In January 2000 they killed a guard dog, in May a calf, and in July another guard dog. They also chased horses during this period. Two wolves from the pack were translocated to southern YNP on May 25 but soon returned to the pack territory. Plans to translocate the alpha female and pups back into YNP were suspended when they returned to the park on their own. In October 2000, workers from the USFWS, Turner Endangered Species Fund, Defenders of Wildlife and Montana Fish Wildlife & Parks, together with ranchers, cooperated to build a “wolf-proof” woven wire and electrical fence around a 4-acre area where the sheep and guard dogs might be protected at night and in the winter. This type of fence was developed by MT FW&P for protecting beehives and sheep from bears.

Sheep Mountain Pack: The Sheep Mountain Pack continued to prey on cattle in the Emigrant/Pray area of Paradise Valley in 2000. In February they attacked 2 yearling cattle, one of which subsequently died. Two days later wolves ran 99 cattle through 2 electric fences nearby. In May, two more yearling cattle were killed. Five members of the Sheep Mountain Pack were darted from a helicopter on May 25. One yearling female died during the capture, and the other 4 wolves, including the alpha female, were placed in a pen at the Flying D Ranch (see aversive conditioning research, p. 9). The last pack member still in the wild was shot on June 23, after two unsuccessful attempts to capture her.

Gravelly Pack: In August, a pack of up to 4 wolves scattered a band of sheep, injuring several, and attacked a guard dog in the Gravelly Range. Two black wolves involved in the attack may have been members of the Gravelly Pack, which has been known to exist for a year or more but does not include any radio-collared wolves. Permits to kill wolves caught in the act of attacking livestock were issued to 2 sheep producers in the area. These permits were not used, and no further conflicts were reported. Attempts to locate and radio-collar the Gravelly Pack in summer 2000 were unsuccessful due to wildfires and public land closures, and the pack has not been located since the depredation occurred.

Southeast Idaho portion of GYA

Soda Springs Wolf: Late in 1999, a lone black wolf began attacking sheep in the Soda Springs area in southeastern Idaho. In the 1999 wolf recovery report, 7 sheep and 1 guarding dog were listed as confirmed depredations by this wolf. In 2000, the lone wolf associated with a feral guarding dog and they continued depredating on sheep in the area. The dog was shot on June 25 and depredations stopped for a time, then resumed. The wolf was snared and killed in November. Total confirmed losses attributed to this wolf in 1999 and 2000 include 21 sheep and 3 livestock guarding dogs. Another 6 sheep were identified as probable wolf depredation, and 46 sheep and 2 livestock guarding dogs as possible wolf depredation.

CENTRAL IDAHO WOLF RECOVERY AREA

Personnel

In 2000, the office of the Nez Perce Tribe wolf recovery project moved from Lapwai to McCall, Idaho. Cheri Ramos joined the Tribal wolf recovery team as the new Office Assistant. In Boise, USFWS wolf recovery coordinator Roy Heberger retired and was replaced by Carter Niemeyer, formerly the Rocky Mountain wolf depredation specialist with USDA/APHIS/Wildlife Services.

Monitoring

During the 2000 field season, 23 wolves were radio-collared. Of that total, 17 new wolves were collared and 6 wolves were re-collared. At the end of 2000, 35 wolves (18% of the population) were being monitored in 15 packs. Another 9 wolves were being monitored as lone or dispersing animals. These packs and lone wolves, along with known uncollared packs, accounted for about 192 wolves in the central Idaho recovery area (Figs. 1, 4; Tables 3, 4). Radio-collared wolves were located approximately twice per month by airplane. Packs included in the central Idaho recovery area as of December 2000 were Big Smokey, Big Hole, Chamberlain Basin, Flint Creek, Jureano Mountain, Kelly Creek, Landmark, Marble Mountain, Moyer Basin, Orphan, Selway, Stanley Basin, Thunder Mountain, Whitehawk, Wildhorse, and Wolf Fang (Table 3, Figure 4).

Reproduction was confirmed in 15 packs producing a minimum of 62 pups. Nine of these packs met the recovery standards of a male and female wolf raising two pups to December 31 (Table 3). One radio-collared wolf died of natural causes and 5 died of unknown causes. Seventeen wolves died of human-related causes (including 10 that were killed in depredation control efforts). Seven collared wolves were known to have dispersed away from their home territory and another 8 wolves are missing and may have dispersed.

Six new Idaho wolf packs were documented in 2000 including Big Smokey, Marble Mountain, Orphan, Whitehawk, Wildhorse, and Wolf Fang. The Big Smokey Pack was formed by uncollared animals from unknown pack origins in the Boise River drainage. Dispersing wolf B48 joined an uncollared wolf to form the Marble Mountain Pack in the Saint Joe River drainage. The last remaining wolf of the Bear Valley Trio, male B28, paired with dispersing female B61 to form the Orphan Pack. Dispersing wolves B40 and B47 and four other uncollared wolves of unknown pack origin formed the Whitehawk Pack in the Bear Valley area. Translocated wolf B2 and dispersing wolf B66 paired to form the Wildhorse Pack. Dispersing wolf B38 paired with an uncollared wolf of unknown pack origin to form the Wolf Fang Pack.

The status of 3 previously established Idaho wolf packs was unknown by the end of 2000 including Twin Peaks, White Cloud, and Snow Peak. The Twin Peaks and White Cloud Packs were removed through relocation and lethal control measures in response to depredations on livestock (see “livestock depredations and management”). Both alpha wolves from the Snow Peak Pack died in late winter of 1999/2000. Although wolf activity continues to be reported from the upper St. Joe and North Fork of the Clearwater drainages, the status of this pack remains unknown.

Ongoing Research

Winter predation and interactions of wolves and cougars in Panther Creek, Central Idaho

Investigators: Dennis Murray and Jason Husseman, University of Idaho; Gary Powers, Lemhi County; and Dick Wenger, US Forest Service.

Cooperators: Nez Perce Tribe, USFWS, University of Idaho, Lemhi County, Salmon Challis National Forest, Bureau of Land Management, Rocky Mountain Elk Foundation, Wolf Education and Research Center, Hornocker Wildlife Institute, Idaho Department of Fish and Game.

This study was initiated to investigate wolf-cougar interactions and predation on wintering ungulate populations, primarily elk and deer. The study area is located within Game Management Unit 28 west of Salmon Idaho, and encompasses the Panther Creek drainage and surrounding areas. Two wolf packs, Jureano Mountain and Moyer Basin have established territories within the study area. In addition, 4-6 cougars were radio-collared and monitored within the study area.

The 2000 field season was the second year of this multi-year project. Samples of wolf and cougar-killed prey indicate that elk and deer comprise the bulk of their winter diets. In wolf diets, elk were represented in greater proportions relative to deer during both years. In addition, elk calves followed by elk cows were favored. Crude kill rates were estimated to be between 3.45 and 4.98 days per kill for both wolf packs over the two field seasons. These figures are thought to underestimate the true kill rate as researchers often lost track of wolves for varying lengths of time, and were unable to search all the areas where wolves had traveled due to terrain and time constraints.

Cougar diets were similar to wolf diets in both species and composition. During both winters, elk were represented in greater proportion relative to deer in samples of cougar killed prey. Likewise, elk calves followed by elk cows were represented in highest proportions in samples of cougar killed elk. Predation of elk bulls by cougars may have been under-represented because a majority of cougars collared were females, which may focus on smaller prey than male cougars. Wolves and cougars tended to kill prey in different habitats, with wolves killing prey in higher elevation areas with low to moderate slopes. A majority of kills occurred in riparian areas. Cougars also tended to kill prey in higher elevations, but kills occurred on significantly steeper slopes with less snow cover.

Winter predation and interactions of wolves and cougars in the Central Idaho Wilderness

Investigators: Jim Akenson, Holly Akenson, and Howard Quigley, Hornocker Wildlife Institute.

Cooperators: Hornocker Wildlife Institute, Nez Perce Tribe, University of Idaho, Charles DeVlieg Foundation, Idaho Department of Fish and Game.

This study was initiated to investigate wolf-cougar interactions and predation on wintering ungulate populations, primarily elk and deer. The study area is located within the Big Creek drainage in the Frank Church-River of No Return Wilderness. The study area encompasses part of the wintering area of the Chamberlain Basin Pack. In addition, 5 cougars were radio-collared and monitored within the study area.

The 2000 field season was the second year of this multi-year project. Samples of wolf and cougar-killed prey indicate that elk and mule deer provide the bulk of wolf and cougar winter diets. In wolf diets, elk were present in greater proportion than deer during both years, and these prey species were taken in proportion to their relative abundance in the study area.

In cougar diets, like wolf diets, elk and mule deer were taken in similar proportion to their relative abundance in 1999. In 2000, however, cougars disproportionately selected deer as prey over elk. This difference between years was attributed to a mild winter and the resulting change in distribution of elk and deer relative to cougars within the study area during 2000.

Elk calves were taken in greater proportion than their availability in both wolf and cougar diets. Older adult cows were the predominant age and sex class of ungulate carcasses found in the study area during both years. Median age of adult elk carcasses was 15 years in 1999 and 10 years in 2000. Mule deer fawns were taken by wolves and cougars in a greater proportion than their availability in the first year and a lesser proportion in the second year. Mule deer killed by wolves and cougars were also primarily older adults, with a median adult age of 7 years in 2000.

Wolves visited cougar kill sites, but researchers did not document cougars visiting wolf kill sites. Researchers felt wolf presence in cougar home ranges affected cougar movements.

A large-scale forest fire burned much of the Big Creek winter range in August 2000. This resulted in a shift to an adjacent winter range by some elk and the wolf pack in winter 2000-2001. Effects of this forest fire on predator-prey relationships will be explored in the future years of this study.

Preliminary assessment of wolf predation on livestock on the Diamond Moose allotment in Central Idaho

Investigators: Dennis Murray and John Oakleaf, University of Idaho; Curt Mack, Nez Perce Tribe; Rick Williamson, Wildlife Services.

Cooperators: University of Idaho, Nez Perce Tribe, US Fish and Wildlife Service, USDA/APHIS/Wildlife Services, Salmon Challis National Forest, Lemhi County Cattle Association, Diamond Moose Association, Lemhi County, Defenders of Wildlife, Wolf Education and Research Center, National Wildlife Federation, Idaho Cattle Association.

The Diamond Moose Calf Mortality Study is designed to better identify the extent of livestock losses to wolves on the Diamond Moose Grazing Allotments administered by the Salmon Challis National Forest.

We examined interactions between the Moyer Basin and Jureano wolf packs and cattle, on a USFS grazing allotment near Salmon, Idaho in an attempt to evaluate effects of wolves on calf survival. The Diamond Moose Association (DMA) calf losses increased over historic levels following wolf establishment. Despite this increase, few calf mortalities were conclusively documented as being the result of wolf depredation. During the 1999 grazing season, we embarked upon a two-year study to determine the fate of calves by radio-marking one third of the total calf population (n=231). Overall, calf survival was high (95%, 98% for 1999 and 2000 respectively), with relatively few mortalities (n=9, n=5) among the marked population. Natural calf mortality (pneumonia, unknown causes, fire mortality), and wolf-caused calf mortalities represented 64% and 29% of deaths (n=14), respectively during the two grazing-seasons. The Jureano Mountain Pack was deemed responsible for 2 of 3 unmarked calf deaths on the DMA. An additional six mortalities (2 in 1999 and 4 in 2000) attributed to wolves were discovered on a neighboring pasture. The fate of 33 missing calves on the DMA was unknown at the conclusion of the study.

Detection rates for all causes of mortalities (marked and unmarked calves) were low within the DMA (1 of 2.3 mortalities) and similar to detection rates for wolf-caused calf mortality (1 of 2.3). Detection rates of wolf-caused mortality dropped considerably (1 of 5.7) when marked calves were removed from this estimate. Calves selected by wolves were significantly younger than average ($p < 0.05$), indicating that ranchers should consider altering calving periods to favor older calves in areas with wolves. Calf vulnerability to predation appeared to be correlated with spatial proximity to wolf home ranges and rendezvous sites. Wolf control actions coupled with natural and illegal wolf mortality apparently reduced the rate of wolf-caused calf mortality.

Outreach

Program personnel presented informational talks and status reports throughout the year to various federal and state agencies, public and private institutions, special interest group organizations, and rural communities. Additionally, scores of informal presentations to small groups or individuals were conducted during this time.

Livestock depredations and management

Idaho Wildlife Services reports a continued gradual increase in the number of potential wolf depredation investigations and control actions implemented. Within the Central Idaho Recovery Area, wolves were confirmed to be involved in 25 of the 51 investigations conducted, affecting 26 producers. Wildlife Services initiated 20 control actions during 2000 in the Central Idaho Recovery Area. Livestock losses included 15 confirmed calves killed, 4 probable calves killed, 4 possible calves killed, 39 confirmed sheep killed, 3 probable sheep killed, and 4 possible sheep killed. Ten of 15 cattle killed by wolves were on private land. All sheep depredated by wolves in Idaho were killed on public Forest Service grazing allotments, while those killed in the Montana portion of the Central Idaho recovery area were on private land. Six wolf packs were involved in confirmed livestock depredations: Jureano Mountain, Twin Peaks, White Cloud, Big Smokey, Stanley Basin, and Flint Creek. In addition, wolves of unknown origin were involved in two confirmed depredations near Arco and McCall, Idaho. In response to depredations, 4 wolves were collared and released on site (two of those were later lethally controlled), 8 were relocated, and 10 were lethally controlled. In addition, the two remaining pups from the Jureano Mountain Pack's 1999 litter were relocated during a management action to prevent possible future depredations.

Jureano Mountain Pack: Control actions, illegal take, disease, and dispersal through the summer of 1999 essentially eliminated the Jureano Mountain Pack. Surviving pack members, two pups of the year, were helicopter darted in March 2000 and relocated to the Selway-Bitterroot Wilderness after they habitually scavenged close to livestock operations. Although the pups did not stay together, both survived and are currently being monitored. A dispersing Jureano Mountain Pack female paired with an unknown mate and returned to claim her mother's vacated territory. The revived Jureano Mountain Pack was implicated in two depredation events on public grazing allotments during summer 2000 resulting in confirmed losses of 3 calves. No control actions were implemented in either incident. In one incident, cattle were successfully moved out of the area, and the other was part of the Diamond Moose calf mortality research project.

Twin Peaks Pack: The Twin Peaks Pack depredated livestock on private land during the winter calving season. Livestock depredation continued between January and March and included confirmed losses of 5 calves. Control actions resulted in the relocation of the alpha pair (B18 and B35), the lethal control of 4 wolves, and the collaring and release on-site of one wolf (B83). After control, pack composition was estimated to be 3 uncollared subadult wolves. Their current status is unknown, although wolf activity was reported in the area throughout the summer. The alpha female, B35, was presumed pregnant at the time of her relocation. The Twin

Peaks Alpha pair remained together after release and appeared to settle in an area south of Anaconda, Montana (Mount Haggin Pair). U.S. Fish and Wildlife Service biologists were not able to document the breeding status of this pair over the summer. Radio contact was lost last fall and their current status is unknown. Wolf B83 dispersed to Baker, Oregon where he was hit and killed by an automobile.

White Cloud Pack: The White Cloud Pack depredated livestock on private property during the winter calving season. Confirmed losses included 4 calves. Control actions resulted in relocation of 4 wolves to the Selway-Bitterroot Wilderness, and lethal control of 5 wolves (including the alpha male which was initially relocated). Relocated wolves included the pregnant alpha female B36, the alpha male B85, and two subordinate pack members (B63 and B86). The intent was to relocate as many of the pack as possible and maintain pack integrity. It was hoped that the birth of pups would anchor the relocated “pack” close to the release site. Unfortunately, the wolves split up immediately after release. Unexpectedly, the alpha male left the female and returned to his territory where he was killed during further control actions. Alpha female B36 produced a minimum of 2 pups, raising them on her own in the Lost Trail Pass area near Gibbonsville, Idaho. In Fall 2000, B36 (and presumably her pups) joined her son B86 in the Big Hole area of Montana. Wolves have attempted to recolonize this area on at least two previous occasions, but a large portion of the Big Hole is in private ownership producing large numbers of livestock. During the winter, when natural prey is scarce, livestock become extremely vulnerable to wolf predation. Two previous recolonizing attempts by wolves in this area resulted in lethal removal of those wolves. As a proactive conservation measure, the Recovery Project is attempting to relocate the White Cloud wolves to northern Idaho. Relocated wolf B63 also frequented the north end of the Big Hole but has stayed out of livestock producing areas, traveling between the Big Hole and Bitterroot Valley of Montana.

Big Smokey Pack: The Big Smokey Pack was discovered when they killed 5 sheep in early summer. In response to confirmed depredations, Wildlife Services and Nez Perce Tribal trapping crews captured and radio-collared 2 wolves. They were released on site to better determine the status of the pack. Subsequent monitoring confirmed reproduction and the presence of a new pack. Although the Big Smokey Pack frequented both sheep and cattle allotments throughout the summer, no further depredations were reported. Two radio-collared wolves from this pack, including the suspected alpha male, were illegally shot during the winter. The current status of the pack is unknown.

Stanley Basin Pack: The Recovery Program committed much time and effort addressing livestock depredations involving the Stanley Basin Pack in Summer 2000. The Stanley Basin Pack continued to depredate on livestock from early June through mid September, despite efforts to discourage depredations. They were involved in 11 depredation events resulting in the loss of 27 sheep and at least 1 calf. Nez Perce Tribal field crews and members of the Boulder White Cloud Council engaged in intensive monitoring and non-lethal hazing to prevent wolves from interacting with livestock. Control actions resulted in the relocation of two pack members, including the alpha male, and lethal control of one pack member. Continued livestock depredations by the Stanley Basin Pack despite management and control efforts indicate the

difficulties of keeping wolves from killing livestock, once they have incorporated livestock into their diet. The chronic nature of the problem also indicates the need for more creative management and a higher level of cooperation among the Recovery Project, other agencies, organizations, and livestock producers to resolve wolf-livestock conflict.

Flint Creek Pack: In October 2000, a new pack of at least 3 wolves was discovered when they killed sheep northwest of Deer Lodge, Montana. This area near the Flint Creek Range is in the northeast corner of the Central Idaho wolf recovery area. Five sheep were confirmed killed by wolves. No control action was taken. The pack contained no radio-collared members and has not been located again.

PLANNING AND LEGAL ISSUES

Law Enforcement

The United States Fish and Wildlife Service Division of Law Enforcement has continued to place wolf recovery at the highest priority. All wolf deaths are investigated to first determine cause of death and then to identify the person or persons responsible for the killing of the wolf if it was a human caused mortality. Much of the Law Enforcement effort is geared toward preventing illegal killings of wolves. For the past two years, Law Enforcement has sent wolf identification information to over 20,000 hunters per year. This information is designed to prevent mistaken-identity wolf killings and also solicits information on wolf sightings by hunters. Due to the importance of each individual wolf, Law Enforcement Agents have spent a great amount of time contacting individuals and groups who will be living or dealing with wolves. These contacts are geared to provide an understanding of the laws protecting wolves and the reintroduction program. These contacts are often conducted during horseback patrols in wilderness areas occupied by wolves.

It is very important to the Law Enforcement effort to have good general information regarding wolf locations. It is also imperative to recover wolf carcasses as soon as possible after a death so that the cause of death can be accurately determined. Wolf collaring and the monitoring of collars continues to be of great benefit to the Law Enforcement effort.

The Division of Law Enforcement is providing assistance and training in nonlethal munitions as a tactic for dealing with wolf depredation on pets and livestock. Law Enforcement Agents have also provided training to wolf recovery personnel regarding bear safety and identification of information that may be useful during investigations of illegal wolf killings.

Appeals Court ruling on wolf relocations

On January 13, 2000, the Tenth Circuit Court of Appeals overturned the December 1998 Wyoming District Court ruling that the reintroduction program was unlawful and should be revoked. The Tenth Circuit ruling stated that: "We reverse the order and judgement of the

district court, vacate the district court's stay order, and remand with instructions to the district court to enter an order upholding the challenged wolf reintroduction rules.” In its opinion the Tenth Circuit also stated that "Discerning no conflict between the challenged experimental population rules and the Endangered Species Act, we reverse the district court's order and judgement.” The Secretary of the Interior issued a statement: “I am very pleased that the courts have given a ringing endorsement to our wolf reintroduction program in Yellowstone National Park and central Idaho. The court clearly agreed that the U.S. Fish and Wildlife Service's reintroduction program is fully consistent with the Endangered Species Act. Wolf reintroduction is a powerful demonstration of this Nation's commitment to protecting and restoring endangered species. This decision is a welcome vindication of our efforts to preserve this magnificent species.”

Proposed National Reclassification of the gray Wolf

On July 11, 2000 the Service published a Federal Register notice that proposed a change in the status of the gray wolf under the Endangered Species Act. The proposal addressed the status of the gray wolf in the lower 48 states. The proposal announced the Service's intent to (1) focus future gray wolf recovery efforts only in certain parts of the species' historic range, (2) recognize recovery progress and adjust the degree of protection under the Act in those areas to further promote recovery, and (3) eliminate the protections of the Act in the remaining portions of the species' range where recovery actions are not necessary or feasible. Public comment on this proposal were solicited until November 10, 2000 and all written and oral comments are being analyzed. Initial comment received during public hearings and meetings indicated general opposition to the Service's proposal. Instead people attending those meetings generally testified they wanted more wolves in more places under full federal ESA protections.

In the northwestern U.S. the Service proposal recommended that the Yellowstone and central Idaho experimental population areas not be changed. The proposal also recommended that because the wolf population in Montana, Idaho, and Wyoming had exceeded 20 breeding pairs for more than 3 successive years, the gray wolf outside the experimental population areas be reclassified from endangered to threatened status. The Service proposed that wolves in the northwestern U.S. classified as threatened be managed under special rules similar to those used in the experimental population areas. The proposal can be viewed at:

<http://midwest.fws.gov/wolf/proposal/index.htm>

Idaho wolf management planning

The Idaho State Legislature established a committee in 1992 to oversee the participation of IDFG in development of the EIS on wolf reintroduction to Yellowstone and Central Idaho. The Legislative wolf oversight committee includes 7 members, including the Chairmen of the legislature's Senate and House Resource Committees, a member appointed by the Idaho State Animal Damage Control Board, 2 citizens appointed by the state Department of Agriculture, and 2 citizen members appointed by the IDFG. The legislative wolf oversight committee drafted a wolf monitoring and recovery plan in 1994 in anticipation of the reintroduction that winter, but

the state legislature rejected that plan and prohibited further involvement of the IDFG in wolf recovery activities. As recovery progressed in the first years following the reintroduction, several constituent groups began to increase their interest in getting the state involved in wolf management. The state legislature extended the life of its wolf oversight committee so that the committee could develop a management plan to enable the state to take over management of wolves upon delisting.

The Idaho Wolf Oversight Committee began developing a post-delisting management plan in 1999, and in April 2000 presented a draft to the legislature's House and Senate Resource Committees. The legislative committee members were opposed to several aspects of the draft plan and the wolf oversight committee responded by redefining where wolves would be permitted to reestablish and expanding the area where they would not be permitted to reestablish. The draft plan was circulated to the public during the summer, and content of the public comments was analyzed in November. Wolf oversight committee members met in December and made substantive changes to their draft management plan in response to comments received from the public. The committee delivered the draft plan to the USFWS in January 2001 for review. The Service responded with comments and suggestions in February. The revised plan is expected to be completed in 2001.

Montana wolf management planning

The Montana Wolf Management Advisory Council was appointed by former governor Racicot in April 2000. The Council is charged to advise Montana Fish Wildlife & Parks as it prepares a management plan for wolves once they are delisted. The Council is composed of 12 members from around the state who represent a variety of interests including tribal, agriculture, hunting, and wildlife conservation. Using an "interest-based" process, the Council specifically deliberated issues related to: defense of life and human safety, livestock depredation, compensation, management of prey populations, and wolf conservation and management. A Technical Committee, composed of personnel from federal and state agencies that are or will become involved in future wolf management, assisted the Council.

At the conclusion of their first round of deliberations, the Council reported their findings to both former-Governor Racicot and Governor Martz in December 2000. Governor Martz accepted their Report and directed Montana Fish, Wildlife & Parks to continue the planning process and draft a management plan, using the Council's 26 Guiding Principles as the foundation. The Council recognizes that the wolf is a native species and a valuable part of Montana's wildlife heritage, and that management of the species must be integrated within the complex social, economic, political, and biological landscape of Montana. A draft management plan will be presented to the Council in 2001. The Council's Report to the Governor can be viewed at <http://www.fwp.state.mt.us/wildlife/wolf/report.html>

ROCKY MOUNTAIN WOLF PUBLICATIONS APPEARING IN 1999-2000

- Bangs, E. E., S. H. Fritts, J. A. Fontaine, D. W. Smith, K. M. Murphy, C. M. Mack, and C. C. Niemeyer. 1998. Status of gray wolf restoration in Montana, Idaho, and Wyoming. *Wildlife Society Bulletin* 26:785-798.
- Boyd, D. K., and D. H. Pletscher. 1999. Characteristics of dispersal in a colonizing wolf population in the central Rocky Mountains. *J. of Wildlife Management* 63:1094-1108.
- Claar, J. J., et.al., 1999. Carnivores. Pages 7.1- 7.63 in Effects of Recreation on Rocky Mountain Wildlife: A Review for Montana (G. Joslin and H. Youmans, coordinators). Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307 pp.
- Fascione, N., H. Ridgley, and M. Selden, 2000. Proceedings of Defenders of Wildlife's Carnivores 2000: A Conference on Carnivore Conservation in the 21st Century. Defenders of Wildlife, Washington D.C. 208 pp.
- Fritts, S. H., C. M. Mack, D. W. Smith, K. M. Murphy, M. K. Phillips, M. D. Jimenez, E. E. Bangs, J. A. Fontaine, C. C. Niemeyer, W. G. Brewster, and T. J. Kaminski. Outcomes of hard and soft releases in the reintroduction of wolves to central Idaho and the Greater Yellowstone area. in Large Mammal Restoration: Ecological and Sociological Challenges in the 21st Century (D. S. Maehr, R. F. Noss, and J. L. Larkin, editors). Island Press (in press).
- Fritts, S. H. 2000. Review of "Carnivores in Ecosystems: the Yellowstone Experience." *Ecology* 81(8): 2351-2352.
- Kunkel, K. E., D. H. Pletscher. 1999. Species-specific population dynamics of cervids in a multipredator ecosystem. *Journal of Wildlife Management* 63:1082-1093.
- Kunkel, K. E., T. K. Ruth, D. H. Pletscher, and M. G. Hornocker. 1999. Winter prey selection by wolves and cougars in and near Glacier National Park, Montana. *Journal of Wildlife Management* 63:901-910.
- Kunkel, K.E. and D.H. Pletscher. 2000. Habitat factors affecting vulnerability of moose to predation by wolves in southeastern British Columbia. *Canadian Journal of Zoology* 78:150-157.
- Mack, C., and K. Laudon. 1999. Idaho wolf recovery program: The restoration and management of gray wolves in central Idaho. Progress Report 1995-1998. Nez Perce Tribe, Department of Wildlife Management, Lapwai, ID. 22 pages.
- Montana Wolf Management Advisory Council, 2000. Report to the Governor. Montana Fish, Wildlife & Parks, Helena. 12 pp.

- Reinhart, D. 1999. Gray wolves (*Canis lupus*). Pp 31-36 in Effects of winter recreation on wildlife of the Greater Yellowstone Area: A literature review and assessment (T. Olliff, K. Legg, and B. Kaeding, editors). Report to the Greater Yellowstone Coordinating Committee. Yellowstone National Park, Wyoming. 315 pp.
- Smith, D. W., W. G. Brewster, and E. E. Bangs. 1999. Wolves in the Greater Yellowstone Ecosystem: restoration of a top carnivore in a complex management environment. Pages 103-125 in Carnivores in Ecosystems (T. Clark et al., eds.). Yale University Press.
- Smith, D. W., K. M. Murphy, and D. S. Guernsey, 1999. Yellowstone Wolf Project: Annual Report, 1998. National Park Service, Yellowstone Center for Resources, Yellowstone National Park, Wyoming, YCR-NR-99-1. 14 pp.
- Smith, D.W., L.D. Mech, M. Meagher, W.E. Clark, R. Jaffe, M. K. Phillips, and J.A. Mack. 2000. Wolf-bison interactions in Yellowstone National Park. *Journal of Mammalogy* 81(4):1128-1135.
- Smith, D. W. and M.K. Phillips. 2000. Northern Rocky Mountain Wolf. in Endangered Animals: A Reference Guide to Conflicting Issues (R. Reading and B. Miller, eds).
- USDA./APHIS/Idaho Wildlife Services. 2001. Wolf Activity Report, Fiscal Year 2000. USDA/APHIS/Wildlife Services, 9134 West Black Eagle Drive, Boise ID 83709. 14 pp.
- USFWS, Nez Perce Tribe, USNPS, and USDA/APHIS/ WS. 2000. Rocky Mountain Wolf Recovery 1999 Annual Report. USFWS, 100 N Park, Suite 320, Helena MT 59601. 23 pp. <http://mountain-prairie.fws.gov/wolf/annualrpt99/>

CONTACTS

For further information or to report wolf sightings, please contact:

U. S. Fish and Wildlife Service, Helena MT:	(406) 449-5225
U. S. Fish and Wildlife Service, Kalispell MT:	(406) 751-4581
U. S. Fish and Wildlife Service, Lander WY:	(307) 332-7789
U. S. Fish and Wildlife Service, Boise ID:	(208) 378-5639
Yellowstone Center for Resources, YNP WY:	(307) 344-2243
Nez Perce Tribal Wolf Program, McCall ID:	(208) 634-1061

To report livestock depredations:

USDA/APHIS/Wildlife Services, Montana:	(406) 657-6464
USDA/APHIS/Wildlife Services, Wyoming:	(307) 261-5336
USDA/APHIS/Wildlife Services, Idaho:	(208) 378-5077

To report discovery of a dead wolf or information regarding the illegal killing of a wolf:

U.S. Fish and Wildlife Service Special Agent, Billings, MT:	(406) 247-7355
U.S. Fish and Wildlife Service Special Agent, Missoula, MT:	(406) 329-3000
U.S. Fish and Wildlife Service Special Agent, Bozeman, MT:	(406) 582-0336
U.S. Fish and Wildlife Service Special Agent, Great Falls, MT:	(406) 453-4761
U.S. Fish and Wildlife Service Special Agent, Casper, WY:	(307) 261-6365
U.S. Fish and Wildlife Service Special Agent, Lander, WY:	(307) 332-7607
U.S. Fish and Wildlife Service Special Agent, Cody, WY:	(307) 527-7604
U.S. Fish and Wildlife Service Special Agent, Boise, ID:	(208) 378-5333
U.S. Fish and Wildlife Service Special Agent, Idaho Falls, ID:	(208) 523-0855
U.S. Fish and Wildlife Service Special Agent, Spokane, WA:	(509) 928-6050

This report may be copied and distributed as needed.

It is available on the Internet at : <http://mountain-prairie.fws.gov/wolf/annualrpt00/>

Suggested citation: U.S. Fish and Wildlife Service, Nez Perce Tribe, National Park Service, and USDA Wildlife Services. 2001. Rocky Mountain Wolf Recovery 2000 Annual Report. USFWS, Helena MT. 35pp.

ACKNOWLEDGMENTS

Hundreds of people have assisted us with wolf recovery efforts and we are indebted to them. It would be impossible to individually recognize them all in this report. The personnel primarily responsible for wolf recovery efforts included Ed Bangs, Joe Fontaine, Mike Jimenez, Diane Boyd, Tom Meier, Roy Heberger, Carter Niemeyer (US Fish and Wildlife Service); Douglas W. Smith, Kerry Murphy, Debra Guernsey (US National Park Service), Shaney Evans (Yellowstone Park Foundation); Curt Mack, Isaac Babcock, Kent Laudon, Marcie Carter, Jim Holyan, Jaime Five Crows, Cheri Ramos (Nez Perce Tribe), and Val Asher (Turner Endangered Species Fund).

Major contributions to wolf recovery efforts were provided by Commodore Mann, Rick Branzell, Doug Goessman, Dominic Domenici, Tim Eicher, Roy Brown, Steve Magone, Roger Parker, Paul Weyland, and Rich McDonald (USFWS Law Enforcement Agents), Dave Skates, Jeff Kimber, and Laurie Connell (USFWS Lander, WY), Jeff Green, Mark Collinge, Layne Bangerter, Craig Maycock, Chuck Carpenter, George Graves, Jeff Ashmead, Douglas Hunsaker, Jonathan Farr, Justin Mann, Rick Williamson, Gary Rushane, Sam Kocherhans, Dave Thomas, Rick Phillips, Rod Krischke, Merrill Nelson, Craig Maycock, Steve Moyles, Casey Hunter, Jed Edwards, Tracy Frye, Larry Handegard, Dave Nelson, Jim Hoover, Jim Stevens, Graeme McDougal, Mike Hoggan, Ted North, Jim Rost, Gene Bucklin, Richard Martin, and Steve DeMers (USDA/APHIS/Wildlife Services).

We thank our pilots Dave Hoerner of Red Eagle Aviation, Lowell Hanson of Piedmont Air Services, Tim Graff and Lee Anderson with the State of Montana, Bob Hawkins and Gary

Brennan of Hawkins and Powers Helicopters, Roger Stradley of Gallatin Flying Service, Gary Lust of Mountain Air Research, Jerry Hyatt and Sheldon Rasmussen of Sky Aviation, Pat and Mike Dorris, Gary Meritt and other pilots of McCall Wilderness Air, Bill Stewart of Northstar Aviation, Bob Danner of SESS Air, Ray Arnold of Arnold Aviation, and Lisa and Steve Robertson, for their skill and determination.

Gina Patton, Adam Gall, Jerome Lawther, Dick Wenger, Gary Powers, and Jim and Holly Akenson assisted with efforts in Idaho. Dave Ausband, Craig Campbell, Pat DeJong, Paul Frame, Vernon Hawthorne, Nancy Hawthorne, Kerry Healy, Julianne O'Reilly, Kari Rogers, and Daly Sheldon assisted with wolf capture in Montana. Susy Buhler, Amy Edmonds, Meg Hahr, Therese Hartman, Kerry Healy, Terrence McClelland, and Stephanie Schmitz monitored wolves in Glacier National Park. Volunteers in YNP included Melissa Andre, Eric Bergman, Robert Buchwald, Susan Chin, Dana Cole, Paul Frame, Scott Gerum, Rachel Gray, Eric Hallingstad, Kevin Honness, Ky Koitzsch, Deb Lineweaver, Rick McIntyre, MacNeil Lyons, Dan MacNulty, Julie Mao, Julie Nelson, Melissa Peer, Dan Stahler, Linda Thurston, Charles Totten, Nathan Varley, Jason Wilson, Greg Wright, and Tom Zieber. Assisting in monitoring wolves in Wyoming were Dr. Ron Hitchcock of Northwest College and his students Marty Mononi, Seth Oakes, Jerad Werning, Justin Ness, and Sharon Baruch-Mordo, and volunteers Jaimie Wisnowski, Miki Kern, Rachel Mazur, Maria Berger, Eric Burnham, Beth Sutherland, Kristina Preiser, Ben Jimenez and Mac Salway.

Numerous agencies have contributed to the recovery program and we thank the US Forest Service (with special thanks to Deb Manley and Spotted Bear Ranger Station), US National Park Service (particularly Reg Altop, Scott Emmerich, Steve Gniadek, and Rick Yates of Glacier National Park), US Bureau of Indian Affairs, Wyoming Department of Game and Fish, Montana Fish, Wildlife & Parks (with special thanks to Region 1 for providing office space in Kalispell, to Carolyn Sime for contributions to this report, and to Fred King of Wall Creek Wildlife Management Area for logistical support), Idaho Department of Fish and Game (particularly Jon Rachael for contributions to this report), and Lost Trail National Wildlife Refuge for providing housing and support for field work. Special thanks to Steve Carson (MTFWP) for preparing maps for this report, and to Jim Renne (USFWS) for producing the website.

Many private organizations have lent their support to the program including Defenders of Wildlife (particularly Hank Fischer for running the rancher compensation program and Suzanne Lavery for helping organize the annual Western Wolf Recovery meeting), the Wolf Education and Research Center, National Wildlife Federation, DeVlieg Foundation, Rocky Mountain Elk Foundation, Snowden Wildlife Sanctuary, and Plum Creek Timber Company. Mike Phillips, Kyrán Kunkel, Liz Bradley and Larry Temple of the Turner Endangered Species Fund helped with wolf recovery in many ways. On the Blackfeet Reservation, Dan Carney, Gayle Skunkcap, Wilbur Calfrobe, and Ira Newbreast helped investigate wolf reports and livestock depredations. The dozens of ranchers and other private landowners whose property is occupied by wolves, sometimes at great cost to the owner, deserve our thanks and consideration. The efforts of many individuals who have contacted us to report wolf sightings are greatly appreciated.

LEGEND (Figure 1):

NORTHWEST MONTANA RECOVERY AREA:

1. Whitefish Pack
2. Grave Creek Pack
3. South Camas Pack
4. Murphy Lake Pack
5. Little Wolf Pack
6. North Camas Pack
7. Ninemile Pack
8. Boulder Pack
9. Spotted Bear Pack
10. Danaher Pack
11. Ovando Pack
12. Alice Creek Pack
13. Fishtrap Pack
14. Browning Pair
15. Sun River Pair

GREATER YELLOWSTONE RECOVERY AREA:

1. Chief Joseph Pack
2. Sheep Mountain Pack
3. Leopold Pack
4. Rose Creek Pack
5. Druid Peak Pack
6. Sunlight Basin Pack
7. Mollie's Pack (formerly Crystal Creek Pack)
8. Nez Perce Pack
9. Yellowstone Delta Pack (formerly Soda Butte Pack)
10. Gros Ventre Pack
11. Teton Pack
12. Washakie Pack
13. Beartooth Pack
14. Absaroka Pack
15. Taylor Peaks Pack
16. Gravelly Pack
17. Mill Creek Pack
18. Swan Lake Pack

CENTRAL IDAHO RECOVERY AREA:

1. Snow Peak Pack
2. Kelly Creek Pack
3. Big Hole Pack
4. Selway Pack
5. Chamberlain Basin Pack
6. Jureano Mountain Pack
7. Moyer Basin Pack
8. Thunder Mountain Pack
9. Landmark Pack
10. Whitehawk Pack
11. Stanley Basin Pack
12. (former members of White Cloud Pack)
13. Wildhorse Pack
14. Big Smokey Pack
15. Orphan Pack
16. Wolf Fang Pack
17. Marble Mountain Pack
18. Mount Haggin Pack (former members of Twin Peaks Pack)
19. Flint Creek Pack

Table 1: Northwest Montana wolf recovery area: Wolf packs and population data 2000

WOLF PACK	PACK SIZE JAN 2001			MORTALITIES			KNOWN		CONTROL		CONFIRMED LOSSES		
	ADULT	PUP	TOT	NATURAL	HUMAN ¹	UNKN ²	DISPERSED	MISSING ³	KILLED	MOVED	CATTLE	SHEEP	DOGS
South Camas	2	0	2		1		1	2					
<u>North Camas</u> ⁴	2	2	4					1					
<u>Murphy Lake</u>	2	3	5		5			1					
<u>Ninemile</u>	5	4	9					1					1
<u>Boulder</u>	5	6	11					1			3		
<u>Whitefish</u>	3	4	7		1	1	2						
<u>Grave Creek</u>	2	2	4			1	1				1		
Little Wolf	1+	?	5?		6				4		2		
Spotted Bear	2	0	2		2	1	4	2					
Danaher	2	2?	4?										
Alice Creek			?									2	
Fishtrap	3		3										
Browning	2		2								3		
Sun River	2		2										
Ovando			2?										
Misc./ Lone	1		1								1		2
Total	34	23	63	0	15	3	8	8	4	0	10	2	3

¹ Includes 4 wolves killed in control actions.

² Does not include 7 pups that disappeared before winter.

³ Missing collared wolves.

⁴ Underlined packs are counted as breeding pairs toward recovery goals.

Table 2: Greater Yellowstone wolf recovery area: Wolf packs and population data 2000.

WOLF PACK	PACK SIZE JAN 2001			MORTALITIES			KNOWN		MISSING ²	CONTROL		CONFIRMED LOSSES ³		
	ADULT	PUP	TOT	NATURAL	HUMAN ¹	UNKN	DISPERSED			KILLED	MOVED	CATTLE	SHEEP	DOGS
<u>Druid Peak</u> ⁴	7	20	27	2	1									
<u>Rose Cr.</u> (2 groups)	10-13	5-8	18	1		1	1							
<u>Leopold</u>	6-8	5-7	13				2		1					
<u>Swan Lake</u>	2	5	7											
Mollie's (Crystal Creek)	4	0	4			1	1		1					
<u>Chief Joseph</u>	7	6	13		1		1				2	1		2
<u>Nez Perce</u>	15	7	22				1							
<u>Y. Delta</u> (Soda Butte)	6	7	13	1		1								
Sheep Mountain	7	0	7		3					3	4	3		
Teton	4	0	4			1			1					
<u>Gros Ventre</u>	3	3	6		2					2		3		3
<u>Washakie</u>	4-5	2-3	6-8											2
<u>Sunlight Basin</u>	6	4	10											
<u>Absaroka</u>	2	3	5											
Beartooth	3	0	3											
<u>Taylor Peaks</u>	3	2	5											
Gravelly Range			5?											
<u>Mill Creek</u>	3+	2+	7											
Loners inside YNP	2	-	2											
Loners outside YNP ⁵	0	-	0	2	2	1				1			39	1
TOTAL	94-100	71-77	177-179	6	9	5	6		3	6	6	7	39	8

¹ Includes 6 wolves killed in control actions.

² Missing collared wolves.

³ Additional losses listed as "probable" or "possible" described in text.

⁴ Underlined packs are counted as breeding pairs toward recovery goals.

⁵ Wolf numbers indicate collared lone wolves. Uncollared lone wolves killed 25 sheep in SW Wyoming, 14 sheep and 1 dog in SE Idaho.

Table 3: Central Idaho wolf recovery area: Wolf packs and population data 2000

WOLF PACK	MIN PUPS PROD	EST PACK SIZE	MORTALITIES			KNOWN DISPERSED	MISSING ²	CONTROL		CONFIRMED LOSSES ³		
			NATURAL	HUMAN ¹	UNKN			KILLED	MOVED	CATTLE	SHEEP	DOGS
Big Smoky	6	7		2							5	
Big Hole	0	4-10										
<u>Chamberlain Basin</u> ⁴	8	8-15		1								
Flint Creek		3									5	
<u>Jureano Mountain</u>	6	8					2		2	3		
<u>Kelly Creek</u>	2	8				1						
<u>Landmark</u>	8	6-13		1								
<u>Marble Mountain</u>	2	4										
Moyer Basin	5	11			3							
Orphan	1	3										
<u>Selway</u>	4	9										
Snow Peak		?		1	1							
Stanley Basin	7	?		3		1	2	1	2	1	27	
<u>Thunder Mountain</u>	3	12	1			4	2					
Twin Peaks	0	?		4		1	2	4	2	5		
White Cloud	2	?		5	1			5	4	4		
Whitehawk	1	5-7										
<u>Wildhorse</u>	2	5										
<u>Wolf Fang</u>	5	7										
Lone/Dispersing		9								2	2	
TOTAL	62	NA	1	17	5	7	8	10	10	15	39	0

¹ Includes 10 wolves killed in control actions.

² Missing collared wolves.

³ Additional losses listed as "probable" or "possible" described in text.

⁴ Underlined packs are counted as breeding pairs toward recovery goals.

Table 4: Northern Rocky Mountain States minimum fall wolf population and breeding pairs*, 1979-2000

Minimum fall wolf population:

Year:	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00
Recovery Area:																						
NW MONTANA	2	1	2	8	6	6	13	15	10	14	12	33	29	41	55	48	66	70	56	49	63	64
YELLOWSTONE																	21	40	86	112	118	177
CENTRAL IDAHO																	14	42	71	114	141	192
TOTAL	2	1	2	8	6	6	13	15	10	14	12	33	29	41	55	48	101	152	213	275	322	433

Breeding pairs:

Year:	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00
Recovery Area:																						
NW MONTANA								1	2	1	1	3	2	4	4	5	6	7	5	5	6	6
YELLOWSTONE																	2	4	9	6	8	13
CENTRAL IDAHO																		3	6	10	10	9
TOTAL								1	2	1	1	3	2	4	4	5	8	14	20	21	24	28

* By the standards of the Rocky Mountain gray wolf recovery plan and wolf reintroduction environmental impact statement, a breeding pair is defined as an adult male and an adult female wolf, accompanied by 2 pups that survived at least until Dec 31. Recovery goals call for 10 breeding pairs per area, or a total of 30 breeding pair distributed through the 3 areas, for 3 years. Breeding pair count for NWMT was increased to 6 for 1999 after Boulder Pack was determined to have bred and raised pups.

Table 5: Rocky Mountain States: Confirmed wolf depredation and wolf control, 1987-2000.

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	TOTAL
<u>Northwest Montana Recovery Area:</u>															
cattle	6	0	3	5	2	1	0	6	3	9	16	9	13	10	83
sheep	10	0	0	0	2	0	0	0	0	0	30	0	19	2	63
dogs	0	0	0	1	0	0	0	0	2	1	0	0	2	3	9
wolves moved	0	0	4	0	3	0	0	2	2	10	7	0	4	0	32
wolves killed	4	0	1	1	0	0	0	0	0	4	14	4	9	4	41
<u>Yellowstone Recovery Area:</u>															
cattle									0	0	5	3	4	7	19
sheep									0	13	67	7	13	39	139
dogs									1	0	0	4	6	8	19
wolves moved									6	8	14	0	0	6	34
wolves killed									0	1	6	3	9	6	25
<u>Central Idaho Recovery Area:</u>															
cattle									0	4	1	10	16	15	46
sheep									0	24	29	5	57	39	154
dogs									0	0	4	0	5	0	9
wolves moved									0	5	0	3	15	10	33
wolves killed									0	1	1	0	6	10	18
<u>Total, 3 States, 3 Recovery Areas:</u>															
cattle	6	0	3	5	2	1	0	6	3	13	22	22	33	32	148
sheep	10	0	0	0	2	0	0	0	0	37	126	12	89	80	356
dogs	0	0	0	1	0	0	0	0	3	1	4	4	13	11	37
wolves moved	0	0	4	0	3	0	0	2	8	23	21	3	19	16	99
wolves killed*	4	0	1	1	0	0	0	0	0	6	21	7	24	20	84

* Includes 2 wolves legally shot by ranchers. Others killed in government control efforts.

Since 1987, Defenders of Wildlife has made compensation payments totalling more than \$150,000 for wolf damage to livestock and guard dogs. Information on the compensation program is available at <http://www.defenders.org/wolfcomp.html>

Figure 1. Idaho, Montana and Wyoming Wolf Recovery Areas

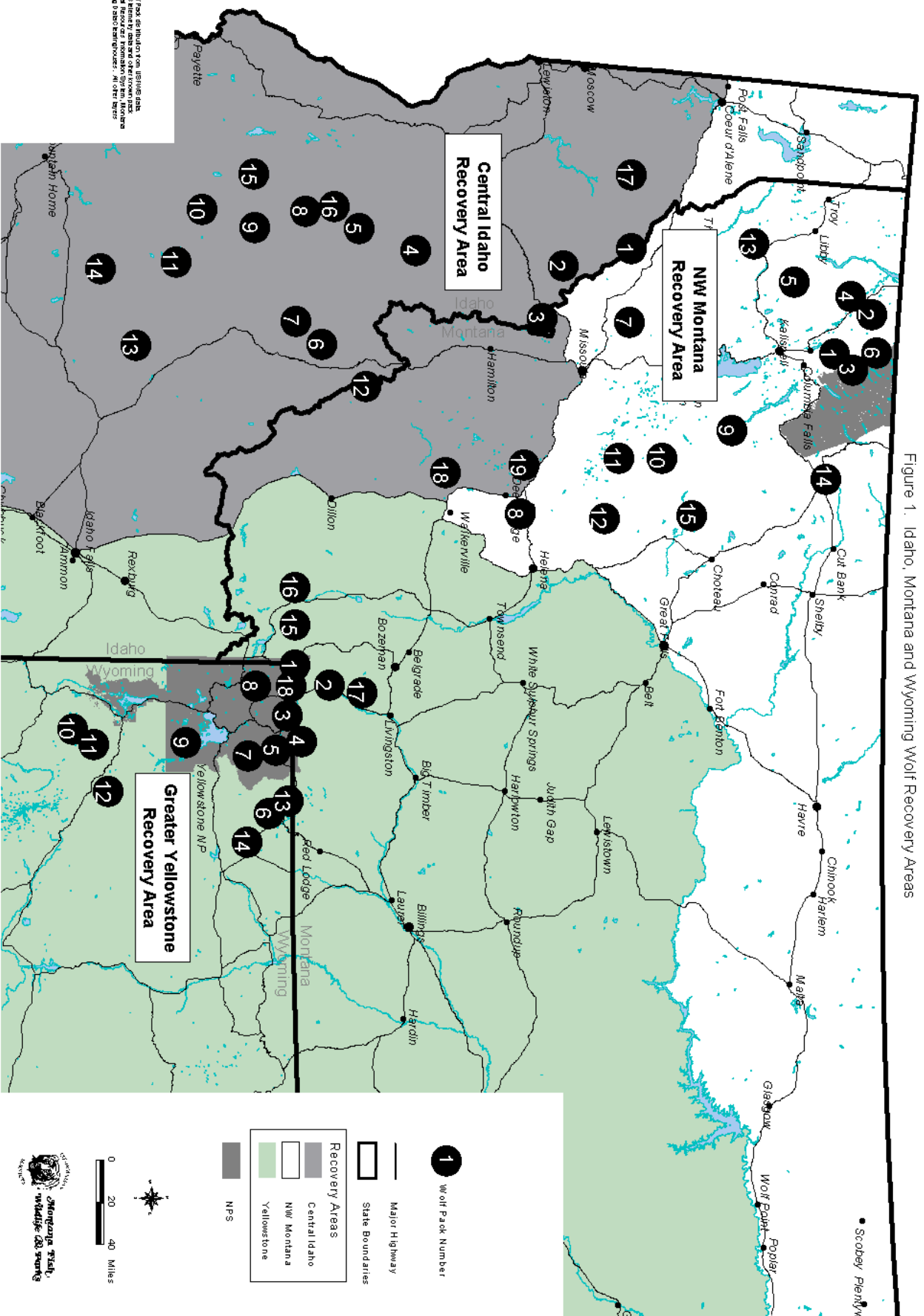
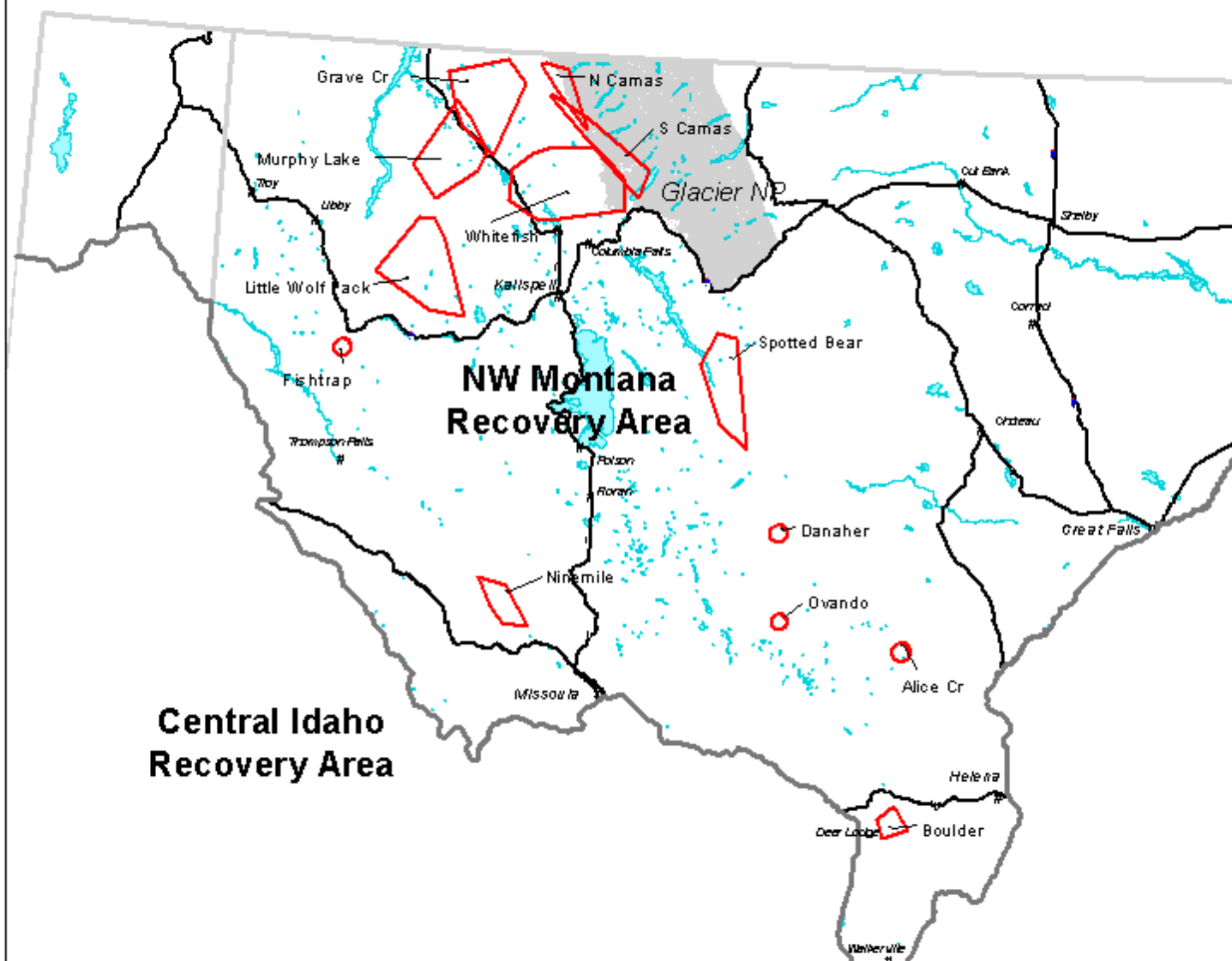


Figure 2. NW Montana Wolf Recovery Area Map



MFWP Information Services Unit digitized Wolf Pack distribution from USFWS data. Data digitized at various scales using USFWS telemetry data and other known pack location data. All other data layers from Natural Resources Information System, Montana State Library, Helena, MT, Idaho and Wyoming Data Clearinghouses. All other layers digitized at 1:100,000.

Map produced by:
Montana Fish, Wildlife and Parks
Information Services Unit
1420 East Sixth Ave.
Helena, MT 59602
406-444-7722

Requests/WOLF/WDG-15apr
80-3-19-2001



0 10 20 Miles

Wolf Pack Distribution
Wolf Recovery Area Boundary
State Boundary

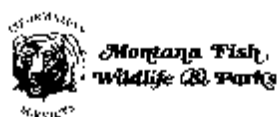
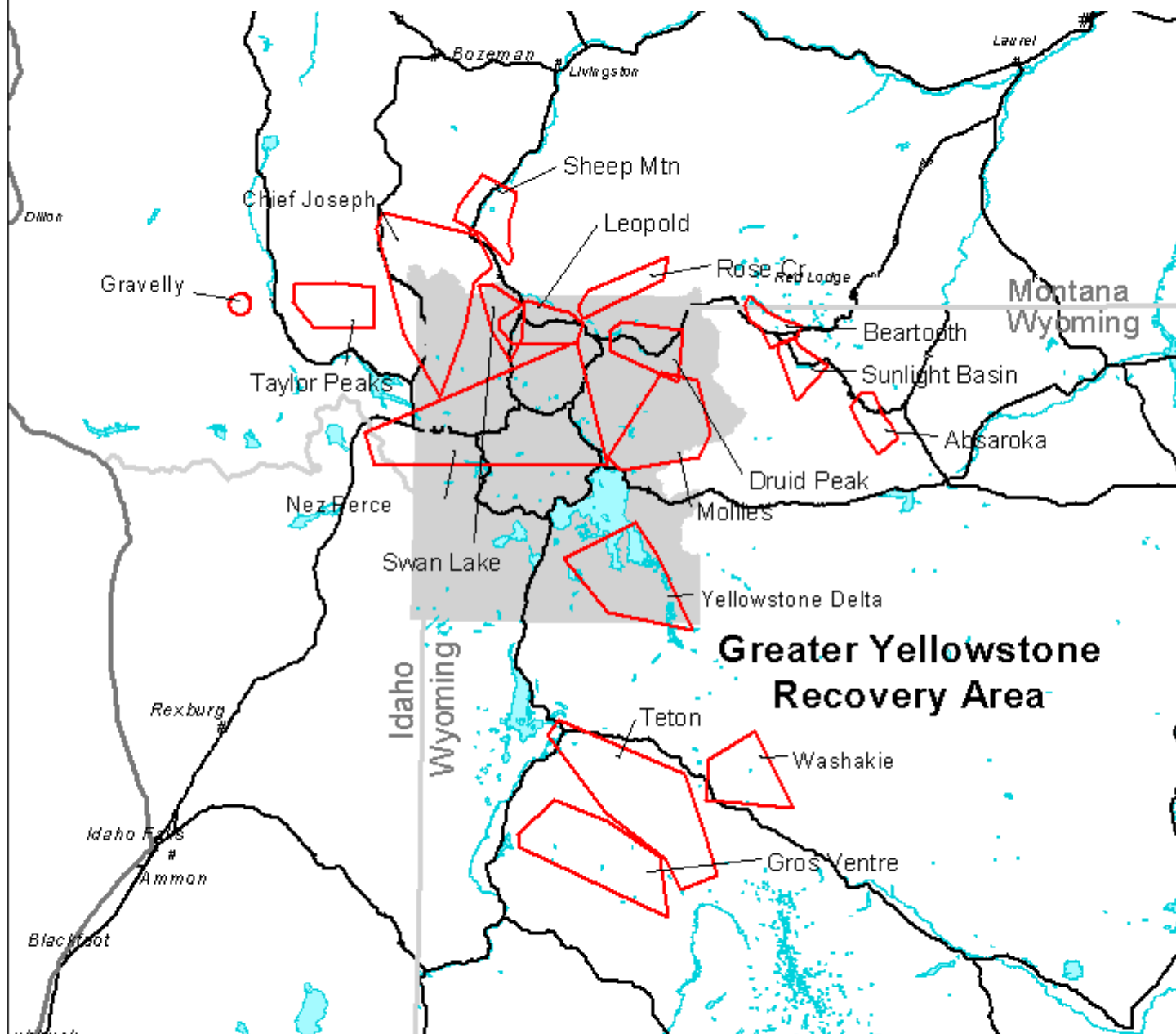


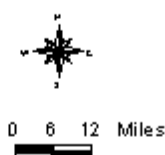
Figure 3. Greater Yellowstone Wolf Recovery Area Map



MFWP Information Services Unit digitized Wolf Pack distribution from USFWS data. Data digitized at various scales using USFWS telemetry data and other known pack location data. All other data layers from Natural Resources Information System, Montana State Library, Helena, MT, Idaho and Wyoming Data Clearinghouses. All other layers digitized at 1:100,000.

Map produced by:
Montana Fish, Wildlife and Parks
Information Services Unit
1420 East Sixth Ave.
Helena, MT 59602
406-444-7722

Requests/WOLF/WDG-15apr
80-3-19-2001



Wolf Pack Distribution
Wolf Recovery Area Boundary
State Boundary

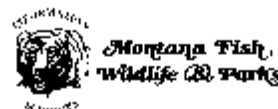
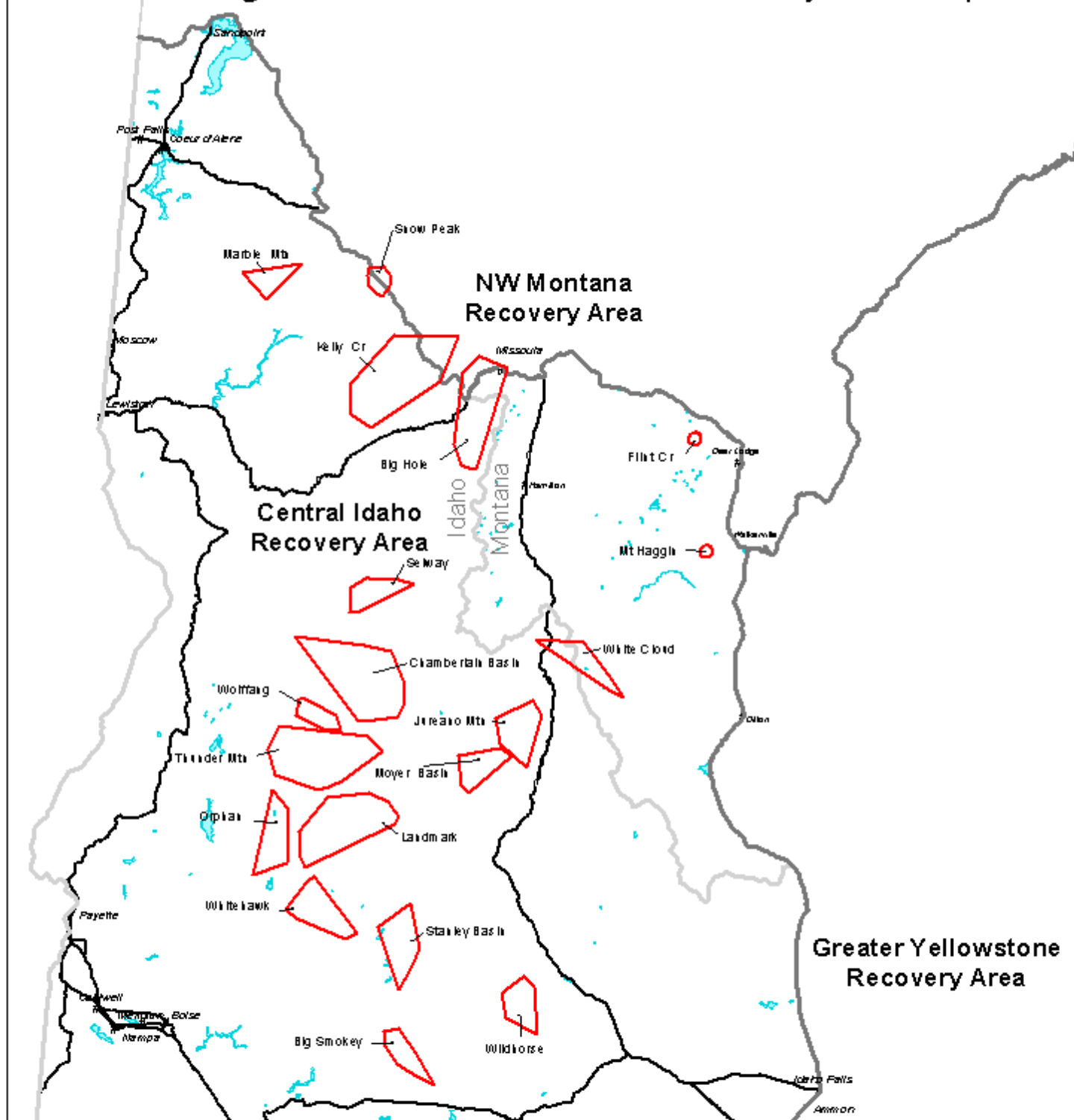


Figure 4. Central Idaho Wolf Recovery Area Map



MFWP Information Services Unit digitized Wolf Pack distribution from USFWS data. Data digitized at various scales using USFWS telemetry data and other known pack location data. All other data layers from Natural Resources Information System, Montana State Library, Helena, MT, Idaho and Wyoming Data Clearinghouses. All other layers digitized at 1:100,000.

Map produced by:
Montana Fish, Wildlife and Parks
Information Services Unit
1420 East Sixth Ave.
Helena, MT 59602
406-444-7722

Requests/Wolf/Wild-15sept
80-3-19-2001



0 10 20 Miles

Wolf Pack Distribution
Wolf Recovery Area Boundary
State Boundary

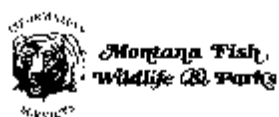


Figure 5: Wolf Population Trends

N. Rocky Mountain States, 1979-2000

